Good to the Last Drop

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Don't let that precious rain go down the drain. Here's how you can save water, reduce pollution, and help wildlife—all at the same time.

By Janet Marinelli

Illustration by Stan Fellows

I used to hate rainy days. the drama of each passing storm escaped me. I'd sulk inside, waiting for the leaden clouds to lift. Then one day several years ago, as a nor'easter lashed our Shelter Island, New York, home, my husband, Don, and I watched the storm water come gushing down our gutters, creating a gully as it carried eroded soil down the driveway. We decided to figure out how much water rolls off our roof each year, and where it all goes.

Like most people, Don and I didn't think a lot about the earth's hydrological cycle, which supports every terrestrial creature, from human being to towering tree, in the form of rain, fog drip, and snow. Over the centuries this precipitation has etched a vast web of watersheds into the planet's surface. However, our huge and costly storm-water infrastructure makes nature's plumbing system invisible. Rainfall is immediately whooshed from our roofs to gutters and downspouts, and channeled by concrete curbs to storm drains and pipes.

The maze of metal and concrete not only makes us oblivious to the natural water cycle, but it also concentrates the pitter-patter of raindrops into a destructive torrent.

In a natural landscape—in a forest, say—there's generally very little runoff. The soil and its dense cover of leaf litter and vegetation act as a sponge, absorbing most of the precipitation. But because we've replaced so much of the natural ground cover with

asphalt, concrete, and other impervious surfaces, rainfall no longer soaks into the soil as readily as it once did. As a result, huge volumes of runoff flow from countless roofs and compacted lawns down driveways and roads to storm sewers, carrying pesticides, motor oil, and other pollutants to nearby streams and rivers, fouling surface waters and destroying aquatic life through sheer physical force. The U.S. Environmental Protection Agency estimates that a typical city block generates nine times more runoff than a woodland area of the same size. According to the EPA, storm-water runoff is the leading threat to the nation's estuaries as well as the third largest problem facing U.S. lakes.

Now that I have a rain garden full of glorious, colorful blooms, I actually look forward to the occasional shower or dramatic downpour. I know that by keeping storm water from running off my property, my rain garden is helping to promote the health of our watershed.

After a few minor calculations, Don and I determined that close to 24,000 gallons of water pour off of our roof each year. (To calculate how much rain runs off your roof, use the formula in "What You Can Do.") We wanted to find a natural, low-tech way to dissipate the runoff and encourage it to seep into the soil. We decided to create a rain garden by directing the storm water from our downspouts into a low area we excavated and filled with lovely native wetland wildflowers.

We decided to locate our rain garden behind the house, where there was an open area with room for an array of moisture-loving plants that can be found in local wetlands. This southwest-facing area gets a few hours of sunlight before the setting sun dips behind the trees of the surrounding woodlands—just enough sunshine to support a decent variety of flowering plants. Because I was determined that our rain garden attract butterflies and ruby-throated hummingbirds, I chose many moisture-loving nectar plants indigenous to our area. In late summer, for example, the massive, dusty pink flower heads of joe-pye weed loom over the rain garden, mingling with the fragrant white flowers of sweet pepperbush and the intense, ruby-colored flower spikes of red lobelia.

Illustration by Stan Fellows

My miniature wetlands has given me a great deal of pleasure. However, I didn't realize just how spectacular a rain garden could be until recently, when I saw the work of Edgar David, a Pennsylvania-based landscape architect. In David's gardens, the storm water

isn't simply whisked safely into a wetland planting; it is celebrated and becomes a focal point of the garden's design. "The flow of water," in his words, "serves as a barometer of the storm, an expression of the natural forces acting on the environment." In one of his rain gardens, on a typical narrow urban lot in Philadelphia's Chestnut Hill section, rainwater collected from the roof cascades into a handsome stone cistern. The water in the cistern can be used to irrigate the intimate native woodland garden that David has re-created on the site. Excess water overflows into an infiltration trench built of stones and gravel beneath the garden path, replenishing groundwater instead of ending up in nearby streams and causing erosion and other ecological damage.

At another of David's rain gardens, at a suburban setting at Temple University's Ambler Campus, outside of Philadelphia, runoff from the roof of an adjacent cottage flows overhead in an "aerial aqueduct," dropping dramatically in two steps as it makes its way to a solar-powered fountain. Storm water running off a nearby terrace is carried by a handsome, plant-lined rocky swale into a native wetland garden. Here some 200 plant species—from bonesets to tussock sedges—filter pollutants from the water as it seeps into the soil.

But you don't have to be a professional landscape designer to create a beautiful rain garden, which is really just a strategically located low area where storm water can be captured to soak naturally into the soil. Begin by observing your landscape when it rains to determine how storm water runs off your property. Typically, the largest sources of runoff are the roof, paved surfaces, and slopes. You can locate your rain garden at the bottom of slopes or next to hard surfaces such as your driveway and sidewalks—along the front walkway or between the sidewalk and the street, for example, to keep runoff from flowing into the road and down the nearest storm sewer. You can also direct runoff from your roof to the side of your house or to the backyard. Not only will a rain garden along the side of the house catch runoff from your roof, it will also create an attractive living fence between you and your neighbor. Wherever they are located, rain gardens can replace high-maintenance lawns, which provide little in the way of visual interest or wildlife habitat. Just keep the garden at least 10 feet from your house—and your neighbor's—to prevent moisture problems in the basement.

There's no regulation size for a rain garden. For example, rain gardens installed by the city of Maplewood, Minnesota—which since 1999 has made these gardens a regular part of its ongoing street-reconstruction efforts—were done in three standard sizes: 12 feet by 24 feet, 10 feet by 20 feet, and 8 feet by 16 feet. Still, no matter what size your rain garden is, it will help reduce the runoff problem. If you are technically minded, you can figure out exactly how large your garden must be to capture the rainfall from all but the biggest storms. First, calculate the area of your rooftop and the average storm-water volumes in your vicinity (or the volume of your sump pump, if you have one).

In late summer the massive, dusty pink flower heads of joe-pye weed loom over the rain garden, mingling with the fragrant white flowers of sweet pepperbush and the intense, ruby-colored flower spikes of red lobelia.

Unless you have a naturally low area in your landscape, you'll need to create a depression by excavating soil—typically the deepest portion of the rain garden will be about six inches below the level of the surrounding land. Some of the topsoil removed from the site will be used to create a porous planting mixture. If your rain garden is located on a slope, you can pack some of the excavated soil along the downhill side to increase the depth of the planting area with less digging. Or you can use the leftover topsoil elsewhere in your yard. It's a good idea to loosen the remaining subsoil in the depression with a shovel or a garden fork. Next, return some of the topsoil, amended with compost and/or sand, if necessary. A blend of 20 percent organic matter, such as compost; 50 percent sandy soil; and 30 percent topsoil will promote good drainage and help break down pollutants. Clay content, which inhibits drainage, should not make up more than 10 percent of the soil mixture. The proper mix will ensure that there is rarely standing water in your rain garden for more than a few hours, or a few days at most—too short a time to breed mosquitoes, which require about a week of standing water to reproduce.

To direct the storm water from the downspout or sump pump outlet, attach a length of plastic pipe and bury it in a shallow trench that slopes down to the rain garden. Alternatively, you can simply lay the pipe on the ground, or create a grassy swale leading from the downspout to your rain garden depression.

Planting a rain garden is the fun part. An appealing variety of native wildflowers, ferns, grasses, shrubs, and trees thrive in moist soil. Your rain garden can be divided into three wetness zones. In the lowest zone, plant species that can tolerate short periods of standing water as well as fluctuating water levels, because a rain garden will dry out during droughts or at times of the year when precipitation is sparse. Species that can tolerate extremes of wet soils and dry periods are also appropriate for the middle zone, which is slightly drier. You can put plants that prefer drier conditions at the highest zone or outer edge of your rain garden. Plant as many species as you can to enhance your rain garden's value as wildlife habitat.

If your rain garden is under existing trees, plant smaller understory trees and shrubs, such as river birch and sweet pepperbush, as well as ferns, sedges, and wildflowers. Re-creating the vertical layers found in a natural forest will provide a number of different habitat niches for a variety of birds and other animals. If you are planting in a sunny area, a wet meadow full of colorful prairie wildflowers and grasses is an appropriate choice. Gardeners in arid areas should plant the species that grow naturally along streamsides and desert washes, such as acacia, hackberry, and desert willow. (For an extensive list of region-specific plant recommendations, see "Plants for Your Rain Garden." The listed plants are particularly attractive to birds and butterflies.)

When you're finished planting, add a three-inch layer of hardwood mulch, to suppress weeds. The mulch will also remove any heavy metals from the precipitation before it percolates down into the groundwater.

Although rain gardens require some initial effort, they are a cinch to maintain. Until your plants become established, you may have to weed out undesirable volunteers. Leave the

dormant plants in place over the winter to provide seeds and shelter for overwintering birds and butterflies. In spring, cut back or mow the stalks to allow new shoots to emerge. Reapply mulch when necessary.

Now that I have a rain garden full of glorious, colorful blooms, I actually look forward to the occasional shower or dramatic downpour. I know that by keeping storm water from running off of my property, my rain garden is helping to promote the health of our watershed. My rain garden provides multiple other satisfactions as well. It creates valuable habitat, meeting the needs of brilliant butterflies, peepers, birds, and other wildlife. At the same time, our little wetland planting helps replenish the underground reservoir that provides the fresh, pure drinking water that supports my family and me.

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Plants for Your Rain Garden

The following are some native plants suitable for a rain garden in your part of the country. These plants are attractive to butterflies, birds, and other wildlife. Be sure to choose species appropriate for the degree of sun or shade on the site.

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Midwest and Great Plains

Wildflowers, ferns, grasses, and sedges

Aster puniceus, Purple-stemmed aster
Caltha palustris, Marsh marigold
Eupatorium maculatum, Joe-pye weed
Eupatorium perfoliatum, Boneset
Geum rivale, Water avens
Helianthus grosseserratus, Sawtooth sunflower
Liatris pycnostachya, Prairie blazing star
Lobelia spicata, Pale-spiked lobelia
Mimulus ringens, Monkey flower
Solidago spp., including *S. gigantea*, *S. ohioensis*, and *S. riddellii, Goldenrods*
Verbena hastata, Blue vervain
Vernonia gigantea, ssp. gigantea, Tall ironweed
Thelypteris palustris, Marsh fern
Calamagrostis canadensis, Canada bluejoint
Carex comosa, Bottlebrush sedge
Carex muskingumensis, Palm sedge

Trees and shrubs

Alnus incana ssp. rugosa, Speckled alder
Asimina triloba, Pawpaw
Betula nigra, River birch
Myrica gale, Sweet gale
Sambucus canadensis, American elderberry
Spiraea virginiana, Virginia spiraea
Viburnum dentatum, Arrowwood